Title 15 - Mississippi State Department of Health

Part III – Office of Health Protection

Subpart 77 – On-site Wastewater

APPENDIX 03 DESIGN STANDARD: AGGREGATE REPLACEMENT

100 Introduction

In a conventional onsite wastewater system treatment begins in the septic tank, under anaerobic conditions. Final treatment and disposal takes place in the soil of the drain field, an aerobic environment. It is necessary for this aerobic condition to exist in the soil of the drain field for proper treatment of the effluent.

101 Definitions

101.01 Chamber System - a system of bottomless molded plastic chambers installed in direct contact with the trench bottom to infiltrate primary treated effluent into the soil for final treatment and disposal.

101.02 Aggregate Replacement Disposal System - any normally gravity-fed subsurface disposal field utilizing an alternate media or technology to act as a replacement for the aggregate media. These system depths range from 36 to 6 inches in depth.

Standard Subsurface Disposal	25 in. to 36 in.
Shallow Subsurface Disposal	13 in. to 24 in.
Ultra-shallow Subsurface Disposal	6 in. to 12 in.

101.03 Large Diameter Aggregate Replacement System - subsurface disposal system that utilizes large diameter pipe covered with a filtering material approved by the Mississippi State Department of Health for use in IOWDS systems.

101.04 Multi-Pipe Aggregate Replacement System - subsurface disposal system that utilizes a multiple arrangement of piping, approved by the Mississippi State Department of Health, to replace the aggregate media of conventional soil absorption systems for use in IOWDS systems.

101.05 Treatment - a process applied to wastewater which causes the resulting effluent to meet or exceed EPA secondary standards for treated wastewater for surface discharge and which does not endanger the public health.

102 Site Evaluation

102.01 Information obtained during the soil and site evaluation will determine which type(s) of IOWDS may be utilized for an individual lot.

102.02 Prior to completing the Soil and Site Evaluation/System Recommendation, the Environmentalist shall visit the lot and conduct the soil and site evaluation.

102.03 The soil determinations will be made based on soil borings to a depth of five feet or to a depth sufficient to reach a restrictive horizon. Restrictive soil or site conditions may preclude the use of any subsurface disposal system.

102.04 A soil and site evaluation will be based on the following criteria:

1. Absence of or protection from frequent flooding.
2. Landscape position with good surface runoff.
3. Slopes of less than 15%.
4. Depth to high water table of greater than four feet.
5. Depth to bedrock, fragipan or plinthite of greater than four feet.
6. Soil texture and color defined by the Natural Resource Conservation Service as indicating good drainage and suitability for soil absorption, based on a soil boring of five feet.
7. Available area in which to install an individual onsite wastewater disposal system meeting all requirements of this regulation. The area for repairs and future extensions shall be no less than 50% of the space required for the recommended system. Systems utilizing surface land application discharge are exempt from the 50% additional area requirement.

102.05 The non compliance of one or more of the above items may require a design alteration of an underground system.

103 Location of Onsite Wastewater Disposal Systems

103.01 All components of the onsite wastewater disposal system shall be located a minimum of:

1. five feet from any dwelling.
2. ten feet from any property line.

103.02 Any vessel holding wastewater shall be located a minimum of 50 feet from any public, private or individual potable water source.

103.03 The effluent disposal field shall be located at a lower elevation or in a landscape position that will preclude any surface runoff from flowing in the direction of the well site and a minimum of 100 feet from any public, private or individual potable water source.

103.04 Potable water lines shall not pass under or through any part of the sewage disposal system. Where a water supply line must cross a sewer line, the bottom of the water service within ten feet of the point of crossing, shall be at least 12 inches above the top of the sewer line. The sewer line shall be of Schedule 40 pipe with cemented joints at least ten feet on either side of the crossing. Water and sewer lines shall not be laid in the same trench. The water and sewer lines, when laid on the same elevation, shall maintain a minimum separation distance of 10 feet.

103.05 The surface of or the surface above the disposal field shall not be used for vehicular traffic or vehicular parking.

103.06 No portion of an onsite wastewater disposal system shall be located under dwellings or other permanent structures.

103.07 Effluent disposal systems shall not be located in depressed areas where surface water will accumulate. Provision shall be made to minimize the flow of surface water over the effluent disposal field.

103.08 Subsurface wastewater disposal fields located on slopes of less than eight percent shall have a minimum setback from recreational waters, shellfish waters or other sensitive areas [See Table I].

103.09 Subsurface wastewater disposal fields located on slopes of greater than eight percent shall be located a minimum of 100 feet from recreational waters, shellfish waters and other sensitive areas.

103.10 Slopes of greater than 30% shall not be considered for subsurface disposal installation.

103.11 Where all or part of the onsite wastewater disposal system is proposed to be installed on property other than the owner's, an easement in perpetuity shall be legally recorded in the proper county. The easement shall be of sufficient area to permit access, construction and maintenance of the onsite sewage disposal system.

103.12 No site for an effluent disposal field or expansion area shall be approved which is located wholly within an area which is frequently flooded, swamp, marsh, or wetland. Except that if permits have been issued by the proper regulatory agency authorizing the use of wetlands for building sites, the property shall be evaluated using standard soil and site criteria for IOWDS.

103.13 When a proposed lot is located partially within a frequently flooded area, that portion of said lot not within the flood prone area may be considered for approval for the effluent disposal field.

103.14 There shall be maintained a minimum of 12 inches of unsaturated soil between the bottom of the subsurface disposal system and a perched or seasonal water table in soils that contain a restrictive horizon (fragipan, chalk, bedrock, clay or silty clay) within five feet of the surface.

103.15 There shall be maintained a minimum of 24 inches of unsaturated soil between the bottom of the subsurface disposal system and any perched or seasonal water table in soils that do not contain a restrictive horizon (fragipan, chalk, bedrock, clay or silty clay) within five feet of the surface.

103.16 Easements or right-of-way areas for utilities, surface or subsurface drainage, roads, streets, ponds or lakes shall not be used as available space for location of individual onsite sewage disposal systems.

104 Underground Absorption

104.01 Aggregate replacement systems shall comply with all criteria for subsurface gravel disposal systems except in sections pertaining to the gravel media or as specified in this regulation.

104.02 The size of the subsurface sewage disposal system shall be determined by soil texture and estimated wastewater flow.

104.03 Soils with excessively rapid permeability rates, gravel and coarse sand, shall be considered unsuitable for subsurface disposal unless the native soil is replaced with a suitably thick (greater than two feet) layer of loamy sand or sand textured soil.

104.04 Soils with excessively slow permeability rates, silty clay and clay, shall be considered unsuitable for conventional subsurface disposal.

104.05 Subsurface disposal systems shall be placed no deeper than 36 inches below the surface.

104.06 Aggregate replacement subsurface disposal systems shall have a minimum 12 inches of soil backfill.

104.07 The minimum distance between absorption trench sidewalls shall be six feet.

104.08 Trenches shall not be excavated when the soil is wet enough to smear or compact easily.

104.09 There shall be a minimum of three feet of undisturbed soil between the excavation for the septic tank or treatment plant and the beginning of the absorption trench, bed or effluent line.

104.10 The bottom of the outlet of the septic tank, aerobic treatment plant or vessel supplying effluent to the pipe must be a minimum of one inch above the top of the aggregate replacement system.

104.11 Care must be taken when backfilling to prevent the pipe from shifting during the backfilling process.

104.12 Soil material excavated from trenches shall be used in backfilling and should be left mounded over the trenches until initial settling has taken place.

104.13 Standard manufactured fittings compatible with the pipe shall be used to connect all pipes within the effluent disposal field.

105 Alternating Disposal Fields

105.01 An alternating effluent disposal field system provides two complete disposal fields, separated by a valving system so that each system could alternately be used and rested. This "resting" has shown to be useful in regenerating the soil's capability for absorbing the effluent.

105.02 The size of each field can be from 50 to 100 percent of the required square footage of a single disposal field.

105.03 The length of time each field would be used and then rested will be determined on a case-by-case basis.

106 Shallow and Ultra-shallow Disposal Fields

Shallow or ultra-shallow systems can sometimes be used where the depth to the restrictive horizon or water table is less than the minimum required. Placement of the system may be as shallow as 6 inches for large diameter double-six aggregate replacement pipe systems. Ultra-shallow installations shall be restricted to soil textures of loam or lighter. Shallow installations may be placed in any texture shown as suitable in the system specific sizing tables.

107 Sizing

The large diameter aggregate replacement systems shall be sized in accordance with the following tables.

108 Construction

108.01 Large diameter aggregate replacement absorption trenches shall be a minimum of 24 inches and a maximum of 36 inches in width.

108.02 The bottom of the trenches or bed and the distribution lines shall have a grade from level to no greater than two inches fall per 100 feet for double six inch large diameter aggregate replacement pipe and one inch fall per 100 feet for eight and ten inch large diameter aggregate replacement pipe.

108.03 Overlap filter wrap at coupling joints and seal using factory approved methods.

108.04 The 4" pipe from the septic tank, aerobic treatment plant or vessel supplying effluent to the aggregate replacement pipe shall be installed into an offset connector particular to the type and manufacturer of the pipe. These connectors will also be used when crossovers are constructed to change elevations of field system.

108.05 Fabric must be pulled over offset connector and sealed using a factory approved method.

108.06 The ends of the large diameter aggregate replacement pipe shall be closed with an end cap particular to the type and manufacturer of the pipe.

108.07 Care must be taken during backfilling to prevent the aggregate replacement pipe from "crawling" when backfill is applied.

109 Distribution of Effluent

109.01 Aggregate Replacement Pipe Systems

1. When a change in elevation of the disposal trench is required, a distribution box, connecting lateral or crossover must be used. At the point where a crossover line leaves a lateral, the trench for the crossover line shall be dug no deeper than the top of the Aggregate replacement pipe in the preceding trench so that an undisturbed block of earth will remain in place for the full depth of the aggregate replacement pipe. The distribution box shall be level and supply all lines equally. Field lines must be equal lengths when served by one distribution box.

2. Distribution boxes may be used to connect the effluent line to the effluent distribution lines. Non-perforated rigid pipe shall exit the distribution box for a minimum of five feet at level grade before the effluent distribution line (perforations) begins.

3. Crossover lines shall be laid on undisturbed earth. The invert of the crossover must be at least four inches lower than the invert of the septic tank outlet line. Crossovers shall be constructed as shown in Figure 1.

110 Absorption Beds

Absorption beds may be constructed using large diameter aggregate replacement filter wrap pipe.

110.01 Absorption beds and trenches should be located a minimum of 10 feet from any trees.

110.02 The amount of linear footage required shall be the same as for trench configurations. The bottom of the bed should have a relatively level grade; the grade within the bed shall not exceed the grade allowed for trench installations.

110.03 Lines for distributing effluent shall be spaced from 3 to 6 feet apart with the first and last pipe placed next to the sidewall of the bed. The number of lines will depend on the lineal feet of aggregate replacement line (Table II & III) and width of the bed to be constructed.

110.04 Care should be taken to prevent heavy machinery from damaging the bed during backfilling.

110.05 The effluent must be equally distributed to the bed by means of a distribution box or with a pipe manifold.

110.06 When a change in elevation of the disposal trench is required, a connecting lateral or crossover must be used. At the point where a crossover line leaves a lateral, the trench for the crossover line shall be dug no deeper than the top of the aggregate replacement pipe in the preceding trench so that an undisturbed block of earth will remain in place for the full depth of the pipe. Crossover lines shall be laid on undisturbed earth. The invert of the crossover must be at least four inches lower than the invert effluent line of the septic tank, aerobic treatment plant or vessel supplying effluent to the pipe [Figure 1].

111 Multi-Pipe Aggregate Replacement Systems

111.01 General

The multi-pipe aggregate replacement system is a system that utilizing bundles of four inch perforated pipe to provide a void space. The top pipe in one bundle of this system receives the treated effluent for distribution throughout the disposal system. All multi-pipe aggregate replacement systems must be installed by a Certified Installer that is factory-trained and authorized by the manufacturer.

111.02 Sizing

The multi-pipe aggregate replacement systems shall be sized in accordance with the TABLE IV.

111.03 Construction

1. The bottom of the trenches and the distribution lines shall have a grade from level to no greater than two inches fall per 100 feet for multi-pipe aggregate replacement systems.

2. Multi-pipe aggregate replacement system trenches shall be a minimum of 24 and a maximum of 36 inches in width.

3. The multi-pipe aggregate replacement system must be installed with effluent being distributed to each trench distribution pipe by use of a distribution box or a level pipe header.

   a. When a change in elevation of the disposal trench is required, a distribution box or approved crossover shall be used. The distribution box, if used, shall be level and supply all lines equally.

   b. Distribution boxes may be used to connect the effluent line to the effluent distribution lines. Non-perforated rigid pipe shall exit the distribution box for a minimum of five feet at level grade before the effluent distribution line (perforations) begins.

4. The system shall be covered with a manufacturer-approved, geotextile cloth before backfilling.

5. The geotextile cloth shall cover the open ends of the void and distribution pipes at their termination at the ends of the trench.

111.04 When a change in elevation of the disposal trench is required, an additional distribution box or connecting lateral/crossover must be used. At the point where a crossover line leaves a lateral, the trench for the crossover line shall be dug no deeper than the top of the multi-pipe aggregate replacement distribution pipe in the preceding trench so that an undisturbed block of earth will remain in place for the full depth of the distribution system. Crossover lines shall be laid on undisturbed earth. The invert of the crossover must be at least four inches lower than the invert effluent line of the septic tank, aerobic treatment plant or vessel supplying effluent to the pipe.

112 Expanded Polystyrene (EPS) Aggregate Systems

112.01 General

The EPS Aggregate system utilizes bundles of expanded polystyrene aggregate to replace rock aggregate in a subsurface disposal system. Effluent is distributed via a 4 inch perforated pipe incorporated into the center of one EPS bundle. System configurations of multiple bundles will incorporate one bundle run containing the 4 inch perforated pipe in conjunction with bundles containing only EPS aggregate. This 4 inch perforated pipe receives the treated effluent for distribution throughout the trench. The expanded polystyrene aggregate must be contained in a material that is resistant to the effects of wastewater, will prevent the loss of aggregate from the container and strong enough to retain the shape of the bundles during system installation and backfilling. All EPS Aggregate Systems must be installed by a factory-trained installer that is an authorized representative of the manufacturer.

112.02 Construction

1. The EPS Aggregate System absorption trenches shall be a minimum of 24 inches and a maximum of 36 inches in width.

2. The bottom of the trenches and the distribution lines shall have a grade from level to no greater than two inches fall per 100 feet.

3. The grade shall be measured from the trench bottom and not the effluent distribution line encased in the EPS bundle.

4. The EPS Aggregate system shall be covered with an approved cover material before backfilling. Covering material shall consist of craft paper or other bio-degradable product approved and/or supplied by the manufacturer.

112.03 Distribution of Effluent [EPS Aggregate System]

1. When a change in elevation of the disposal trench is required, a distribution box, connecting lateral or crossover must be used. At the point where a crossover line leaves a lateral, the trench for the crossover line shall be dug no deeper than the top of the distribution pipe in the preceding trench so that an undisturbed block of earth will remain in place for the full depth of the system [Figure 2]. The invert of the crossover must be at least four inches lower than the invert of the septic tank outlet line.

2. Distribution boxes may be used to connect the effluent line to the effluent distribution lines. The distribution box shall be level and supply all lines equally. Field lines must be equal lengths when served by one distribution box. Non-perforated rigid pipe shall exit the distribution box for a minimum of five feet at level grade before the effluent distribution line (perforations) begins.

112.04 Absorption Beds [EPS Aggregate Systems]

Absorption beds may be constructed using the EPS Aggregate system.

1. Absorption beds and trenches should be located a minimum of 10 feet from any trees.

2. The amount of linear footage required for EPS horizontal systems shall be the same as for trench configurations [Table V]. The bottom of the bed should have a relatively level grade; the grade within the bed shall not exceed the grade allowed for EPS trench installations. EPS triangular systems shall not be used in bed configurations.

3. The EPS bundles shall be placed side by side in the bed. The number of bundles will depend on the lineal footage required and the width of the bed to be constructed.

4. Care should be taken to prevent heavy machinery from damaging the bed during backfilling.

5. The effluent must be equally distributed to the bed by means of a distribution box or with a pipe manifold.

112.05 Sizing

EPS Aggregate systems shall be sized in accordance with the following:

113 Chamber Subsurface Disposal Systems

113.01 General

Chamber systems utilize molded plastic bottomless chambers which are installed in a drain field excavation with the open bottom of the chamber in direct contact with the trench bottom. The chambers are linked together in such a manner as to completely cover the excavation with adjacent chambers in contact with each other. Effluent is introduced into the chambers and is absorbed into the soil for final treatment and disposal. All chamber systems must be installed by a factory trained and authorized installer.

113.02 Chamber Class Designation

1. Each model of chamber will be assigned a class designation based on the bottom square footage of the chamber section. This square footage will be derived by a multiple of the outside width and the useable length of the chamber section.

2. Chamber models will be assigned a class designation according to Table VII.

113.03 Construction

1. The chamber system absorption trenches shall be a minimum of 18 inches and a maximum of 36 inches in width.

2. The bottom of the trenches shall have a grade from level to no greater than two (2) inches fall per 100 feet.

3. The grade shall be measured from the trench bottom and not the chamber top.

4. The chamber system shall be covered as per the manufacturer's specifications. In all cases there shall be a minimum of 12 inches of soil cover over the chamber system.

5. The minimum height of a chamber, at its centerline, shall be eleven (11) inches.

6. The last chamber in each "run" shall be terminated with an end plate.

113.04 Distribution of Effluent [Chamber Systems]

1. When a change in elevation of the chamber system is required, a distribution box, connecting lateral or crossover must be used. At the point where a crossover line leaves a lateral, the trench for the crossover line shall be dug no deeper than the top of the endplate inlet or the inlet in the top of the chamber in the preceding trench so that an undisturbed block of earth will remain in place for the full depth of the system. The invert of the crossover must be at least four inches lower than the invert of the septic tank outlet line.

2. Distribution boxes may be used to connect the effluent line to the effluent distribution lines. The distribution box shall be level and supply all lines equally. Field lines (chambers) must be equal lengths when served by one distribution box. Non-perforated rigid pipe shall exit the distribution box for a minimum of five feet at level grade before the effluent distribution line begins.

113.05 Sizing of the Chamber System

1. Chamber systems installed in a trench configuration shall be sized in accordance with Table VIII.

2. Chamber systems installed in a bed configuration shall have the same number of chamber sections as indicated for a trench system. The length and width of the bed to be constructed will depend on the number of chamber sections to be installed as indicated by Table VIII. Any side-by-side placement of chambers shall constitute a bed.

    a. Absorption beds and trenches should be located a minimum of 10 feet from any trees.

    b. The bottom of the bed should have a relatively level grade; the grade within the bed shall not exceed the grade allowed for trench installations.

    c. The chambers shall be placed side by side in a bed with separation between each chamber row per individual manufacturer's requirements.

d. Care should be taken to prevent heavy machinery from damaging the bed during backfilling.

e. The effluent must be equally distributed to the bed by means of a distribution box or with a pipe manifold.

114 Addendum to Section 111 Multi-Pipe Aggregate Replacement Systems

Section 111.05 Absorption Bed [Multi-pipe System] will read as follows:

1. **Multi-pipe systems installed in a bed configuration shall have the same lineal foot requirements as indicated for their respective trench configurations. The length and width of the bed to be constructed will be determined by the number of multi-pipe systems wide and the length selected to comply with the lineal footage required under Table IV.**

2. **The multi-pipe system shall be placed side by side in the bed. Any side by side placement of multi-pipe systems shall constitute a bed.**

3. **The bottom of the bed should have a relatively level grade, from the end and side to side. The grade within the bed shall not exceed the grade allowed for trench installations.**

4. **The effluent must be equally distributed to the bed by means of a distribution box or with a pipe manifold.**

5. **The multi-pipe system may be cut in-order to accommodate setbacks. The multi-pipe system shall be cut to a length which preserves the integrity of the banded void pipes and provides adequate banding of the system a minimum of every 18 inches to a maximum of every 20 inches. Manufactured couplers shall be used to join cut ends of the void pipes.**

6. **The system shall be covered with a manufacturer-approved geotextile cloth before backfilling.**

7. **The geotextile cloth shall cover the open ends of the void pipes.**

8. **Care should be taken to prevent heavy machinery from damaging the bed during backfilling.**

Table I

SETBACK REQUIREMENTS FROM SENSITIVE WATER

Minimum Distance from the Water Edge

Soil Textural Class	Slope of Less Than 8 Percent	Slope of More Than 8 Percent
Gravel	NOT APPLICABLE	
Coarse Sand	100 feet	100 feet
Medium Sand	100 feet	100 feet
Fine Sand	100 feet	100 feet
Loamy Sand	100 feet	100 feet
Sandy Loam	100 feet	100 feet
Light Loam	50 feet	100 feet
Heavy Loam	50 feet	100 feet
Silt Loam	50 feet	100 feet
Sandy Clay Loam	50 feet	100 feet
Light Clay Loam	50 feet	100 feet
Heavy Clay Loam	50 feet	100 feet
Light Silty Clay Loam	50 feet	100 feet
Heavy Silty Clay Loam	50 feet	100 feet
Sandy Clay	100 feet	100 feet
Silty Clay	100 feet	100 feet
Clay	100 feet	100 feet

The effluent disposal setback is based on the soil texture of the horizon in which the absorption trench or bed is to be placed.
These setbacks are to be used on all individual on-site wastewater disposal systems except **Spray Irrigation and Overland Discharge**.

Table II

TEN INCH LARGE DIAMETER PIPE

Results of Soil Evaluation

Soil Textural Class	Ribbon Lengths (Inches)	EPA Manual Application Rate GPD/ Ft^2	Absorption Area Per Bedroom**		Additional Absorption Area Over 2 Persons Per Bedroom**	
			Ft^2	*Lf	Ft^2	*Lf
Gravel	-	-	NOT SUITABLE			
Coarse Sand	-	1.2	125	43	60	20
Medium Sand	-	1.2	125	43	60	20
Fine Sand	-	0.8	190	63	95	32
Loamy Sand	-	0.8	190	63	95	32
Sandy Loam	<.5	0.6	250	83	125	41
Light Loam	<.5	0.6	250	83	125	41
Heavy Loam	.5 – 1	0.45	335	115	165	55
Silt Loam	<1	0.45	335	112	165	55
Sandy Clay Loam	1 – 2	0.45	335	112	165	55
Light Clay Loam	1 – 1.5	0.30	500	167	250	83
Heavy Clay Loam	1.5 – 2.0	0.20	750	250	375	125
Light Silty Clay Loam	1 – 1.5	0.30	500	167	250	83
Heavy Silty Clay Loam	1.5 – 2.0	0.20	750	250	375	125
Sandy Clay	>2.0	-	NOT SUITABLE			
Silty Clay	>2.0	-	NOT SUITABLE			
Clay	>2.0	-	NOT SUITABLE			

Minimum and maximum trench widths are 24 and 36 inches, respectively.

** Bedrooms are equivalent to 150 gallons per day.

Table III

DOUBLE SIX LARGE DIAMETER PIPE

Results of Soil Evaluation

Soil Textural Class	Ribbon Lengths (Inches)	EPA Manual Application Rate GPD/ Ft^2	Absorption Area Per Bedroom**		Additional Absorption Area Over 2 Persons Per Bedroom**	
			Ft^2	*Lf	Ft^2	*Lf
Gravel	-	-	NOT SUITABLE			
Coarse Sand	-	1.2	189	63	96	32
Medium Sand	-	1.2	189	63	96	32
Fine Sand	-	0.8	285	95	144	48
Loamy Sand	-	0.8	285	95	144	48
Sandy Loam	<.5	0.6	375	125	189	63
Light Loam	<.5	0.6	375	125	189	63
Heavy Loam	.5 – 1	0.45	504	168	252	84
Silt Loam	<1	0.45	504	168	252	84
Sandy Clay Loam	1 – 2	0.45	504	168	252	84
Light Clay Loam	1 – 1.5	0.30	750	250	375	125
Heavy Clay Loam	1.5 – 2.0	0.20	1125	375	564	188
Light Silty Clay Loam	1 – 1.5	0.30	750	250	375	125
Heavy Silty Clay Loam	1.5 – 2.0	0.20	1125	375	564	188
Sandy Clay	>2.0	-	NOT SUITABLE			
Silty Clay	>2.0	-	NOT SUITABLE			
Clay	>2.0	-	NOT SUITABLE			

Minimum and maximum trench widths are 24 and 36 inches, respectively.

** Bedrooms are equivalent to 150 gallons per day.

Table III

EIGHT INCH LARGE DIAMETER PIPE

Results of Soil Evaluation

Soil Textural Class	Ribbon Lengths (Inches)	EPA Manual Application Rate GPD/ Ft^2	Absorption Area Per Bedroom**		Additional Absorption Area Over 2 Persons Per Bedroom**	
			Ft^2	*Lf	Ft^2	*Lf
Gravel	-	-	NOT SUITABLE			
Coarse Sand	-	1.2	189	63	96	32
Medium Sand	-	1.2	189	63	96	32
Fine Sand	-	0.8	285	95	144	48
Loamy Sand	-	0.8	285	95	144	48
Sandy Loam	<.5	0.6	375	125	189	63
Light Loam	<.5	0.6	375	125	189	63
Heavy Loam	.5 – 1	0.45	504	168	252	84
Silt Loam	<1	0.45	504	168	252	84
Sandy Clay Loam	1 – 2	0.45	504	168	252	84
Light Clay Loam	1 – 1.5	0.30	750	250	375	125
Heavy Clay Loam	1.5 – 2.0	0.20	1125	375	564	188
Light Silty Clay Loam	1 – 1.5	0.30	750	250	375	125
Heavy Silty Clay Loam	1.5 – 2.0	0.20	1125	375	564	188
Sandy Clay	>2.0	-	NOT SUITABLE			
Silty Clay	>2.0	-	NOT SUITABLE			
Clay	>2.0	-	NOT SUITABLE			

Minimum and maximum trench widths are 24 and 36 inches, respectively.

** Bedrooms are equivalent to 150 gallons per day.

Table IV

MULTI-PIPE SYSTEM

Results of Soil Evaluation

Soil Textural Class	Ribbon Lengths (Inches)	EPA Manual Application Rate GPD/ Ft^2	Absorption Area Per Bedroom**								Additional Absorption Over 2 Person Per Bedroom**							
			14 Pipe		13 Pipe		11 Pipe		9 Pipe		14 Pipe		13 Pipe		11 Pipe		9 Pipe	
			Ft^2	Lf	Ft^2	Lf	Ft^2	Lf	Ft^2	Lf	Ft^2	Lf	Ft^2	Lf	Ft^2	Lf	Ft^2	Lf
Gravel	-	-	NOT SUITABLE															
Coarse Sand	-	1.2	125	42	96	32	111	37	132	44	63	21	48	16	57	19	66	22
Medium Sand	-	1.2	125	42	96	32	111	37	132	44	63	21	48	16	57	19	66	22
Fine Sand	-	0.8	190	63	144	48	168	56	201	67	98	32	72	24	84	28	102	34
Loamy Sand	-	0.8	190	63	144	48	168	56	201	67	98	32	72	24	84	28	102	34
Sandy Loam	<.5	0.6	250	83	189	63	222	74	264	88	125	42	96	32	111	37	132	44
Light Loam	<.5	0.6	250	83	189	63	222	74	264	88	125	42	96	32	111	37	132	44
Heavy Loam	.5 – 1	0.45	335	112	255	85	297	99	354	118	168	56	129	43	150	50	177	59
Silt Loam	<1	0.45	335	112	255	85	297	99	354	118	168	56	129	43	150	50	177	59
Sandy Clay Loam	1 – 2	0.45	335	112	255	85	297	99	354	118	168	56	129	43	150	50	177	59
Light Clay Loam	1 – 1.5	0.30	500	167	381	127	444	148	591	177	250	84	192	64	222	74	267	89
Heavy Clay Loam	1.5 – 2.0	0.20	750	250	570	190	669	223	795	265	375	125	285	95	336	112	399	133
Light Silty Clay Loam	1 – 1.5	0.30	500	167	381	127	444	148	591	177	250	84	192	64	222	74	267	89
Heavy Silty Clay Loam	1.5 – 2.0	0.20	750	250	570	190	669	223	795	265	375	125	285	95	336	112	399	133
Sandy Clay	>2.0	-	NOT SUITABLE															
Silty Clay	>2.0	-	NOT SUITABLE															
Clay	>2.0	-	NOT SUITABLE															

Minimum and maximum trench widths are 24 and 36 inches, respectively.

** Bedrooms are equivalent to 150 gallons per day.

Table V

EXPANDED POLYSTYRENE SYSTEM (EPS) "HORIZONTAL" CONFIGURATION

Results of Soil Evaluation

Soil Textural Class	Ribbon Lengths (Inches)	EPA Manual Application Rate GPD/ Ft^2	Absorption Area Per Bedroom**								Additional Absorption Over 2 Person Per Bedroom**							
			3-10 Inch		1-12 Inch		2-12 Inch		3-12 Inch		3-10 Inch		1-12 Inch		2-12 Inch		3-12 Inch	
			Ft^2	Lf	Ft^2	Lf	Ft^2	Lf	Ft^2	Lf	Ft^2	Lf	Ft^2	Lf	Ft^2	Lf	Ft^2	Lf
Gravel	-	-	NOT SUITABLE															
Coarse Sand	-	1.2	88	35	162	86	86	43	87	29	43	17	82	41	42	21	42	14
Medium Sand	-	1.2	88	35	162	86	86	43	87	29	43	17	82	41	42	21	42	14
Fine Sand	-	0.8	133	53	262	131	132	66	132	44	65	26	132	66	66	33	66	22
Loamy Sand	-	0.8	133	53	262	131	132	66	132	44	65	26	132	66	66	33	66	22
Sandy Loam	<.5	0.6	173	69	346	173	174	87	174	58	88	35	172	86	86	43	87	29
Light Loam	<.5	0.6	173	69	346	173	174	87	174	58	88	35	172	86	86	43	87	29
Heavy Loam	.5 – 1	0.45	233	93	462	231	232	116	231	77	115	46	228	114	114	57	114	38
Silt Loam	<1	0.45	233	93	462	231	232	116	231	77	115	46	228	114	114	57	114	38
Sandy Clay Loam	1 – 2	0.45	233	93	462	231	232	116	231	77	115	46	228	114	114	57	114	38
Light Clay Loam	1 – 1.5	0.30	345	138	690	345	246	173	345	115	173	69	346	173	174	87	174	58
Heavy Clay Loam	1.5 – 2.0	0.20	520	208	1036	518	520	260	231	173	260	104	518	259	260	130	258	86
Light Silty Clay Loam	1 – 1.5	0.30	345	138	690	345	246	173	345	115	173	69	346	173	174	87	174	58
Heavy Silty Clay Loam	1.5 – 2.0	0.20	520	208	1036	518	520	260	345	173	260	104	518	259	260	130	258	86
Sandy Clay	>2.0	-	NOT SUITABLE															
Silty Clay	>2.0	-	NOT SUITABLE															
Clay	>2.0	-	NOT SUITABLE															

Minimum and maximum trench widths are 24 and 36 inches, respectively.

** Bedrooms are equivalent to 150 gallons per day.

Table VI

EXPANDED POLYSTYRENE SYSTEM (EPS) "TRIANGULAR" CONFIGURATION

Results of Soil Evaluation

Soil Textural Class	Ribbon Lengths (Inches)	EPA Manual Application Rate GPD/ Ft^2	Absorption Area Per Bedroom**		Additional Absorption Over 2 Person Per Bedroom**	
			3-10 Inch		3-10 Inch	
			Ft2	Lf	Ft2	Lf
Gravel	-	-	NOT SUITABLE			
Coarse Sand	-	1.2	62	31	30	15
Medium Sand	-	1.2	62	31	30	15
Fine Sand	-	0.8	96	48	48	24
Loamy Sand	-	0.8	96	48	48	24
Sandy Loam	<.5	0.6	126	63	64	32
Light Loam	<.5	0.6	126	63	64	32
Heavy Loam	.5 – 1	0.45	168	84	84	42
Silt Loam	<1	0.45	168	84	84	42
Sandy Clay Loam	1 – 2	0.45	168	84	84	42
Light Clay Loam	1 – 1.5	0.30	250	125	126	63
Heavy Clay Loam	1.5 – 2.0	0.20	376	188	188	94
Light Silty Clay Loam	1 – 1.5	0.30	250	125	126	63
Heavy Silty Clay Loam	1.5 – 2.0	0.20	376	188	188	94
Sandy Clay	>2.0	-	NOT SUITABLE			
Silty Clay	>2.0	-	NOT SUITABLE			
Clay	>2.0	-	NOT SUITABLE			

Minimum and maximum trench widths are 24 and 36 inches, respectively.

The **Triangular Configuration** can only be installed in a trench.

** Bedrooms are equivalent to 150 gallons per day.

Table VII

CHAMBER SYSTEM

Results of Soil Evaluation

CLASS	SQUARE FEET/CHAMBER SECTION
I	7.51 – 9.50
II	9.51 – 11.50
III	11.51 – 13.50
IV	13.51 – 15.50
V	15.51 – 17.50
VI	17.51 – 19.50
VII	19.51 – 21.50
VIII	21.51 – 23.50

Table VIII

CHAMBER SYSTEM

Results of Soil Evaluation

Soil Textural Class	Ribbon Lengths (Inches)	EPA Manual Application Rate GPD/ Ft^2	Absorption Area in Ft2 Per Bedroom**	Absorption Area in Chambers Per Bedroom**								Additional Absorption Area Over 2 Persons Per Bedroom**							
				I	II	III	IV	V	VI	VII	VIII	I	II	III	IV	V	VI	VII	VIII
Gravel	-	-	NOT SUITABLE																
Coarse Sand	-	1.2	88	10	8	7	6	5	5	4	4	5	4	3	3	3	2	2	2
Medium Sand	-	1.2	88	10	8	7	6	5	5	4	4	5	4	3	3	3	2	2	2
Fine Sand	-	0.8	133	15	13	11	9	8	7	6	6	7	6	5	5	4	4	3	3
Loamy Sand	-	0.8	133	15	13	11	9	8	7	6	6	7	6	5	5	4	4	3	3
Sandy Loam	<.5	0.6	175	20	17	14	12	11	10	9	8	10	8	7	6	5	5	4	4
Light Loam	<.5	0.6	175	20	17	14	12	11	10	9	8	10	8	7	6	5	5	4	4
Heavy Loam	.5 – 1	0.45	235	26	22	19	16	14	13	11	10	13	11	9	8	7	6	6	5
Silt Loam	<1	0.45	235	26	22	19	16	14	13	11	10	13	11	9	8	7	6	6	5
Sandy Clay Loam	1 – 2	0.45	235	26	22	19	16	14	13	11	10	13	11	9	8	7	6	6	5
Light Clay Loam	1 – 1.5	0.30	350	39	33	28	28	21	19	17	16	19	17	14	12	11	9	9	8
Heavy Clay Loam	1.5 – 2.0	0.20	525	58	50	40	35	32	28	26	23	29	25	20	17	16	14	13	12
Light Silty Clay Loam	1 – 1.5	0.30	350	39	33	28	24	21	19	17	16	19	17	14	12	11	9	9	8
Heavy Silty Clay Loam	1.5 – 2.0	0.20	525	58	50	40	35	32	28	26	23	29	25	20	17	16	14	13	12
Sandy Clay	>2.0	-	NOT SUITABLE																
Silty Clay	>2.0	-	NOT SUITABLE																
Clay	>2.0	-	NOT SUITABLE																

Minimum and maximum trench widths are 18 and 36 inches, respectively.

** Bedrooms are equivalent to 150 gallons per day.

All chamber sections shall be full length. The use of cut chamber sections is prohibited.

Title 15 - Mississippi State Department of Health

Part III – Office of Health Protection

Subpart 77 – On-site Wastewater

APPENDIX 04 DESIGN STANDARD: SUBSURFACE DRIP IRRIGATION

100 INTRODUCTION

Subsurface Drip Irrigation is a system that utilizes 3 basic design principles. They are (1) uniform distribution of effluent, (2) dosing and resting cycles and (3) shallow placement of tubing. This system uses small diameter pipe with emitters and must be preceded by a treatment system that conforms to the manufacturer's specifications particular to that system. The effluent must be adequately filtered before distribution to the disposal field(s). Only Subsurface Drip Irrigation Systems that provide for **timed dosing** are acceptable. The term manufacturer, unless otherwise specified, is considered the manufacturer of the treatment device. (Figure I)

101 DEFINITIONS

101.01 Advanced Treatment System – an Individual On-site Wastewater treatment system that complies with Section 41-67-10. **MS Code of 1972, Annotated 41-67-2(a)**

101.02 Components – all physical, mechanical, and electrical components of any wastewater disposal system.

101.03 Distribution manifold – pvc pipe that delivers the treated effluent to the drip tubing.

101.04 Emitter – small labyrinth inside of drip tubing that eliminates pressure and releases drops of treated effluent.

101.05 Maintenance – the inspecting and evaluating of an Alternative System or Advanced Treatment System. The replacement of any component registered with a specific Advanced Treatment System (i.e., aerator, diffuser, control panel, etc.).

101.06 Subsurface Drip Irrigation System – a system that relies on advanced treatment and filtration of the treated effluent. Final disposal occurs in the upper limits of the soil horizon and is distributed through small diameter tubes that have emitters that slowly drip the treated water into the soil.

101.07 Tubing – a small diameter line made of a material that forms a tube which contains emitter and manufacturer's fittings.

101.08 Vacuum breakers/air release valve – relieves pressure off the treated effluent and allows air to escape the system without causing damage.

102 DESIGN

Utilizing USDA soil groups as classified by textures is the most appropriate criteria on which to base loading rates for this system. The size of the disposal field shall be based on the most restrictive soil, naturally occurring within 2 feet of the ground surface or to a depth of 1 foot below the trench bottom, whichever is deeper. Criteria and techniques for soil and site evaluation can be found in Chapter 03 Regulation Governing Residential On-site Wastewater Disposal Systems: Soil and Site Evaluation.

102.01 Prior to the design of the Subsurface Drip Irrigation System, the suitability of the site must be demonstrated through acceptable soil permeability rates, acceptable soil conditions (Table I) and other topographic characteristics. The design and construction of the Subsurface Drip Irrigation System must conform to the drip tubing manufacturer's specification (Figure 1).

102.02 A minimum of 6 inches of naturally occurring soil must be present above a restrictive horizon or a predominantly gray soil (>50%) before placement of appropriate fill. Subsurface Irrigation System is not recommendable on hydric soils conditions.

102.03 Except where hydric soils are present, a clean fill material may be used to overcome seasonal water table limitation. The fill material shall consist of a minimum of 50 percent sand particles equal to or greater than 0.25 *mm*. Clay content shall be 20 percent or less. Organic matter shall be removed from the native soil surface prior to placing and incorporating the fill. This fill must be incorporated into the native soil to prevent a textural interface from developing. When fill material is used the entire fill area must be sodded to prevent erosion, or other effective erosion control methods used. The full depth of fill material must extend at least 2 feet in all directions from drip tubing and at that point shall be sloped at a grade of no steeper than 3 to 1.

102.04 In soils that contain a restrictive horizon, within 5 feet of the surface, there shall be a minimum of 12 inches of unsaturated soil between the bottom of the drip tubing and any perched or seasonal water table.

102.05 In soils that do not contain a restrictive horizon, within 5 feet of the surface, there shall be a minimum of 24 inches of unsaturated soil between the bottom of the drip tubing and any perched or seasonal water table.

102.06 Drip tubing must be installed a minimum of 6 inches deep. The maximum depth may not exceed 18 inches. In all cases there shall be a minimum of 12 inches separation between the water table and restrictive horizon.

102.07 Minimum separation between drip emitter shall be 2 feet. A 2 foot horizontal separation must be between drip tubing lines for slopes of less that 20 percent

for slopes of 20 percent or greater shall be a minimum of 3 foot horizontal separation.

102.08 Drip tubing shall either be placed 4 inches lower than the supply manifolds or water breaks shall be used to prevent effluent from flowing along the drip tubing to the supply manifold trenches.

102.09 Valves, fittings, level control switches and all other components must be designed and manufactured to resist the corrosive effects of wastewater and common household chemicals.

102.10 Electrical equipment shall be protected with safety devices (overload interrupting devices, fuses, etc.). Electrical equipment shall comply with appropriate *National Electrical Manufacturer's Association (NEMA)* requirements. Electrical component parts shall be covered by the manufacturer's limited warranty.

103 LOCATION / SETBACKS

103.01 All components of the Subsurface Drip Irrigation System shall be located a minimum of:

1. Water Supply (Public/Private)

   a. 100 feet from any public, private or individual potable water sources, unless protected by topographic features.

   b. 50 feet from any public, private or individual potable water source for all vessel(s) holding wastewater.

2. Water Supply Components

   a. 10 feet horizontal separation from any potable water line.

   b. 10 feet horizontal separation from any water meter.

   c. Potable water lines must not pass under or through any part of the wastewater disposal system which includes the collection and distribution of the wastewater or effluent.

3. Sensitive Waters

   a. 100 feet on slopes of greater than 8 percent

   b. slopes of less than or equal to 8 percent (Table I)

4. Property Lines

   a. 10 feet down slope or same grade

b. 10 feet up slope.

5. Residence and Buildings

a. 5 feet from habitable and non-habitable

6. Additional Structures

a. 5 feet from porches, patios, decks, walkways, driveways and parking areas

b. 25 feet from swimming pools

103.02 No vehicular traffic or parking is allowed in the area of the treatment and disposal system.

103.03 Advanced treatment, pump chamber, and Subsurface Drip Irrigation field shall not be located under dwellings or other permanent structures.

103.04 Disposal shall not be located in depressed areas where surface water will accumulate. Provision shall be made to minimize the flow of surface water.

103.05 Where all or part of the treatment and disposal system is proposed to be installed on property other than the owner's, a deeded easement in perpetuity shall be legally recorded in the appropriate county. The deeded easement shall be obtained to include a sufficient area to permit access, construction and maintenance.

103.06 Deeded easements or right-of-way areas for utilities, surface or subsurface drainage, roads, streets, ponds or lakes shall not be used as available space for location of a Subsurface Drip Irrigation System.

103.07 Drip Tubing shall be on contour and shall not be installed perpendicular (or up and down, etc.) to the slope. Elevation differences in a line or the entire grid shall not exceed the drip tubing manufacturers' specifications.

104 TREATMENT

104.01 Wastewater effluent must meet the requirement established by *American National Standards Institute/National Sanitation Foundation (ANSI/NSF) International Standard Number 40* testing protocol, as set forth in Regulations Governing Residential Individual Onsite Wastewater Disposal Systems: Certification. The type of treatment must also conform to drip tubing manufacturers' specifications.

104.02 The treatment and dosing chamber shall be designed, constructed and installed so all joints, seams, and component parts shall preclude infiltration of groundwater, and prevent escape of wastewater or liquids.

105 DISTRIBUTION

105.01 Drip Tubing

1. The drip tubing may be installed using any of the following methods:

   a. Excavation by a trenching machine.

   b. Approved plowing method as determined by the tubing manufacturer. The insertion tool must be of the type that does not pull or stretch the drip line during insertion. The use of "cable plows" or any type insertion method that employs pulling the drip line through the plowed trench is prohibited.

2. To insure equal dosing of the field there can be no more than a 10 percent variance in the flow between any 2 emitters in the entire field.

3. The length of each distribution line shall not exceed drip tubing manufacturer's specifications to insure equal distribution to each emitter.

4. If necessary, pressure compensating devices or regulators shall ensure equal distribution from all emitters at +/- 10% of the designed discharge rate.

5. Emitter outlet orifices are non-directional device.

105.02 Pump Chambers

1. During normal operating procedures the inlet to the treatment system shall not become surcharged.

2. The pump chamber shall have a minimum capacity of 1.5 times the estimated daily flow.

3. The pump chamber shall be equipped with an audible high water alarm, and may utilize a functional self-opening relief valve.

4. The pump chamber shall have a grade level access allowing a minimum of 17 inch diameter or 15 inch square, to allow servicing and/or removal of the largest component in the chamber. Access ports shall be protected against unauthorized entrance or removal, by use of tamper proof fasteners or a lid weighing 65 pounds or more.

5. The pump chamber shall be vented through the grade level access or by means of a separate vent. In either case, the vent shall be a minimum of 1 inch in diameter.

6. The pump chamber shall be made of material resistant to the corrosive effects of wastewater and designed to withstand the lateral and bearing loads to which it is expected to be subjected.

7. All openings shall be sealed with mastic, butyl rubber or other pliable sealant that is waterproof, corrosion resistant and approved for use in contact with wastewater, in a manner to prevent the entrance of surface and groundwater.

8. The high water alarm must be set as to allow a reserve capacity equal to ½ day estimated flow.

105.03 Minimum Pump Specifications

1. The pumping system shall be capable of dosing the disposal field a minimum of 6 equally spaced doses per 24 hour period. Each dose volume shall not exceed the estimated maximum daily flow divided by the number of dosing cycles. It is acceptable that daily usage of less than the design flow rate will result in a diminished number of cycles. An emergency override float is required to accommodate conditions which exceed the normal daily flow rate. (Table III).

2. The pumping system shall be designed to discharge the required volume of wastewater within the pressure range specified by all component manufacturers.

3. The pump shall be equipped with a low water cutoff to prevent damage to the pump during low water conditions in the pump chamber.

4. The pump shall be constructed of corrosion resistant materials suitable for effluent pumping.

5. The pump shall be sized per pump and components manufacturers' specifications to meet or exceed the hydraulic requirement of the system.

6. The pump shall be installed as not to violate the pump warranty.

7. The suction and pressure lines shall be Schedule 40 or equal and be sized to meet or exceed the hydraulic requirements of the system.

105.04 Minimum Filter Specifications

1. The filter shall filter effluent to prevent clogging to the specifications of the drip tubing manufacturer.

2. The filter shall achieve the required filtration at a rate equal to or greater than the peak discharge rate, including filter and/or system backwash.

3. An independent third party, acceptable to the Division, shall certify the filter performance. Verification from a manufacturer of filters or by an independent registered Professional Engineer.

4. The filter shall be made of material resistant to the corrosive effects of wastewater and common household chemicals.

5. The filter shall be readily accessible for inspection, service and/or maintenance.

6. The filter flush volume and velocity shall be per filter manufacturer's specifications.

7. The filter residue shall be returned to the treatment system.

8. The Subsurface Drip Irrigation System must provide an automatic field flush to prevent the build-up of solids in the distribution system, with its discharge returning to the treatment system and be capable of achieving a flushing velocity of a minimum of 1 foot per second. The return line must be permanently installed as a component of the system. A hose bib shall be prohibited as a component.

105.05 Component Specifications

1. Vacuum breakers shall be installed as per drip tubing manufacturer's specification, a minimum of 1 vacuum breaker/air release valve for each drip field zone.

2. Vacuum breakers shall be located in a protective enclosure that will prevent the accumulation of any substance that would prevent their proper operation and shall have a grade level access.

3. All materials shall meet applicable *American Society for Testing and Materials (ASTM)* standards and be resistant to common household chemicals. The drip tubing manufacturer must certify drip tubing as designed and manufactured for the disposal of wastewater. The drip tubing must be color coded, by the manufacturer, to be easily identified as tubing designed for wastewater disposal.

4. Equipment susceptible to freezing must be adequately protected.

106 DOCUMENTATION

106.01 Installation Manual

1. The drip manufacturer must provide for registration, detailed instructions for installation, initiation of service and operation and maintenance to the

distributor, installer and Division of On-site Wastewater. Specific instructions shall include but not limited to:

a. Recommendations concerning types of wastewater which cannot be disposed of by the system.

b. Arrangement of plumbing connections.

c. Electrical wiring of components.

d. Installation instructions that specifies how to locate the system in well drained areas that also provides protection for vents, pumps, filters and controls from snow, ice, or water vapor accumulations.

e. A drawing with each major component numbered, and identified with the same designation on an illustration, photograph, or print.

f. Recommended frequency of maintenance; maintenance instructions; and procedures for removal and disposal of wastes.

106.02 Homeowner's Manual

1. A Homeowner's manual shall be provided to the consumer by the drip tubing and advanced treatment unit manufacturers with each Subsurface Drip Irrigation system. The manual shall include:

a. Model number.

b. Design and flow diagrams.

c. Limited warranties.

d. Replacement and service policies.

e. General installation instructions that specifies how to locate the system in well-drained areas that also provides protection for vents, pumps, filters, and controls from snow, ice, or water vapor accumulations.

f. Detailed operation and maintenance requirements (including consumer responsibility, parts, and service).

g. Recommendations concerning types of wastewater which cannot be disposed of by the system.

h. Arrangement of plumbing connections.

i. Electrical wiring of components.

106.03 Limited Warranty

1. The manufacturer shall provide a 2 year limited warranty, from date of installation, covering all parts and materials.

2. Each manufacturer shall furnish the consumer with a limited warranty identifying the replacement policy covering all mechanical and electrical component parts.

106.04 Initial Service Policy

1. A 2 year initial service policy shall be furnished to the consumer by the manufacturer, and shall be included in the original purchase price. This policy shall provide as a minimum:

   a. The 4 inspection/service calls (at least one every 6 months) over the 2 year period including inspection, adjustment, and servicing of mechanical, electrical, and other applicable component parts to insure proper function. The first inspection shall be conducted a minimum of 6 months from installation.

2. If any improper operation is observed, which cannot be corrected at the time of the service call, the consumer and the Department shall be notified immediately in writing of the conditions and the estimated date of correction.

106.05 Continuing Maintenance Agreement

A continuing maintenance agreement, in perpetuity, is required on Subsurface Drip Irrigation Systems. Property owner must submit an Affidavit (Maintenance) and a copy of the current continuing maintenance agreement before system is approved or re-approved as an existing system.

106.06 Stand-by Parts

Standby mechanical and electrical component parts shall be stocked by the local distributor for use when the drip system's mechanical or electrical components must be removed from the installation site for repairs.

106.07 Guaranteed Parts

The physical, mechanical and electrical component parts shall be guaranteed against any defects in material and workmanship as warranted. The cost of replacing damaged component parts, not due to reasonable wear and tear, is excluded from this provision.

106.08 Mechanical Parts

1. Mechanical parts shall be protected against damage or impairment of efficiency by flooding or surcharging.

2. Mechanical parts shall not require periodic maintenance or adjustment by the consumer other than changing a fuse and similar devices, or visual inspection of the warning light.

3. Mechanical parts shall be covered by the manufacturer's limited warranty.

106.09 Service

Service shall be available within no more than 2 days following a request.

106.10 Service Label

A clearly visible, permanently attached label or plate, giving instructions for obtaining service, shall be placed at the audible signal.

107 RESPONSIBILITY

The consumer shall be responsible for maintaining and operating the Subsurface Drip Irrigation System in accordance with the Regulations Governing Individual On-site Wastewater Disposal Systems, Appendixes, advanced treatment system manufacturer's specifications and the drip tubing manufacturer's specifications.

108 EXISTING SYSTEM

In addition to the visual inspection conducted by the Environmentalist the following will apply:

108.01 The system must be inspected by a Certified Installer that is manufacturer's authorized representative to verify that the Subsurface Drip Irrigation System is functioning.

108.02 The manufacturer's authorized representative must furnish written verification, to the Department, that an inspection was made.

Figure I

SUBSURFACE DRIP IRRIGATION SYSTEM

(Example sketch only)

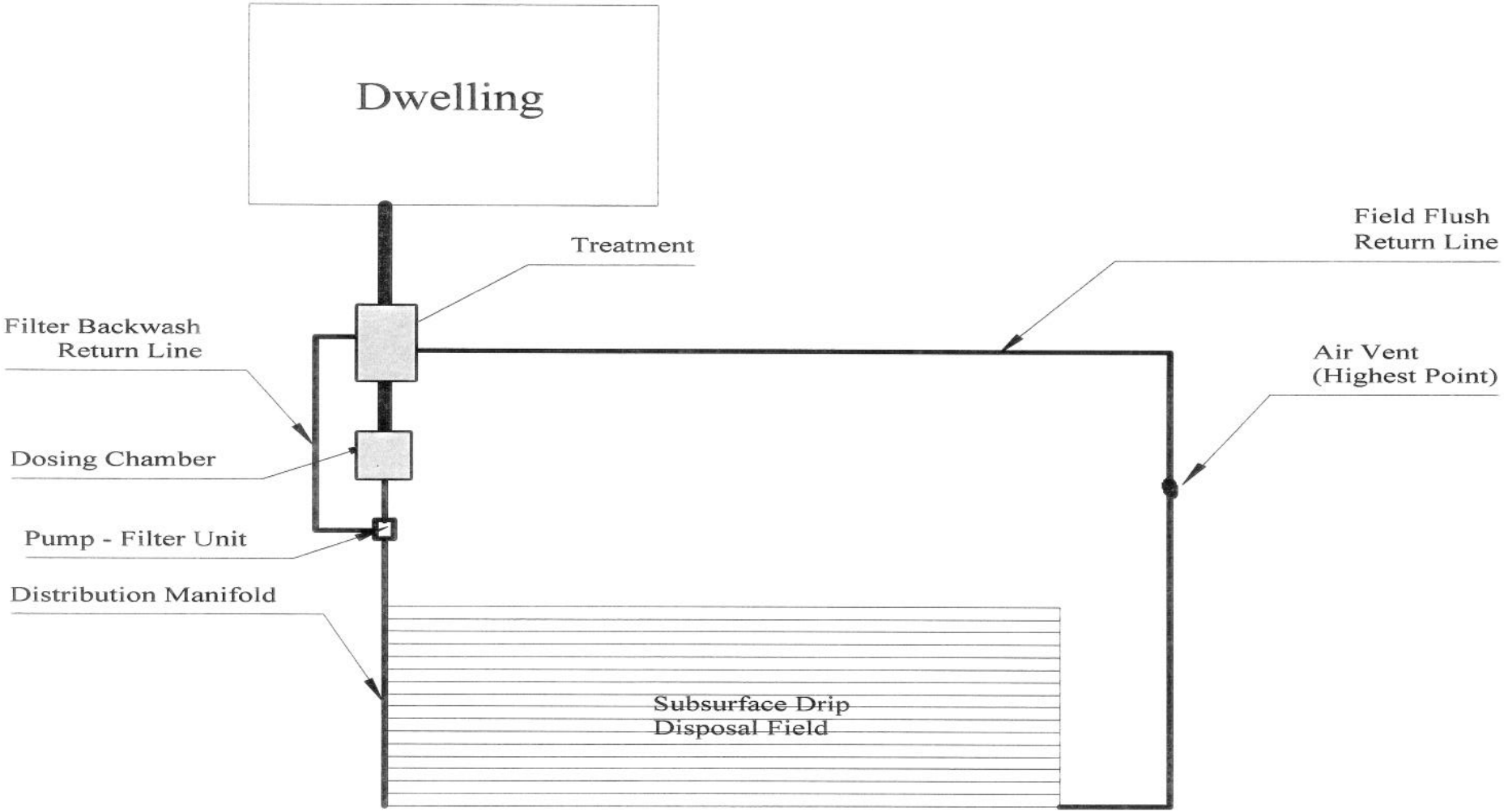


Table I

SUBSURFACE DRIP IRRIGATION SYSTEM

Results of Soil Evaluation

Soil Textural Class	Loading Rate GPD/ Ft^2	Linear feet (Lf) Per Bedroom**	Additional Lf/Person Over 2 Person Per Bedroom**	Depth of Drip Line in Inches
Gravel	NOT SUITABLE			
Coarse Sand Medium Sand Fine Sand Loamy Sand	0.5	150	75	6-18
Sandy Loam Light Loam Heavy Loam Silt Loam Sandy Clay Loam	0.3	250	125	
Light Clay Loam Heavy Clay Loam Light Silty Clay Loam Heavy Silty Clay Loam Sandy Clay	0.15	500	250	
Silty Clay Clay	0.05	1500	750	

The texture of the subsoil material having the slowest permeability rates within 2 feet below the surface receiving effluent shall be used to size the disposal field.

** Bedrooms are equivalent to 150 gallons per day.

Table II

SETBACK REQUIREMENTS FROM SENSITIVE WATER

Minimum Distance from the Water Edge

Soil Textural Class	Slope of Less Than 8 Percent	Slope of Greater Than 8 Percent
Gravel	NOT APPLICABLE	
Coarse Sand Medium Sand Fine Sand Loamy Sand Sandy Loam	100 feet	100 feet
Light Loam Heavy Loam Silt Loam Sandy Clay Loam Light Clay Loam Heavy Clay Loam Light Silty Clay Loam Heavy Silty Clay Loam	50 feet	
Sandy Clay Silty Clay Clay	100 feet	

The texture of the subsoil material having the slowest permeability rates within 2 feet below the surface receiving effluent shall be used to determine setback.

Table III

SUBSURFACE DRIP IRRIGATION SYSTEM PUMP CYCLES

Minimum Requirements

Pump Cycles/24 Hours	Gallons Pumped/Bedroom/Cycle	Additional Gallons Pumped Per Person Over 2 Per Bedroom
6	25	12.5
8	18.75	9.375
10	15	7.5
12	12.5	6.25

Bedrooms are equivalent to 150 gallons per day.

Title 15 - Mississippi State Department of Health

Part III – Office of Health Protection

Subpart 77 – On-site Wastewater

APPENDIX 10 DESIGN STANDARD: OVERLAND DISCHARGE

100 INTRODUCTION

Overland Discharge is a system used to dispose Advanced/Alternate treated effluent. Overland Discharge may be a single (1) point discharge or multi-point (2 or 4) discharge, with a level manifold. These discharge options can be gravity-fed or pressurized, with the use of a pump. Careful evaluation of the site, soils and geographical conditions are necessary to prevent runoff, erosion, groundwater pollution and nuisance conditions.

101 DEFINITIONS

101.01 Advanced Treatment System – an Individual On-site Wastewater treatment system that complies with Section 41-67-10. **MS Code of 1972, Annotated** Section 41-67-2(a)

101.02 Components – all physical, mechanical, and electrical components of any wastewater disposal system.

101.03 Discharge area – area of land receiving the treated effluent.

101.04 Distribution box – A connection source for a single inlet line to multiple distribution lines.

101.05 Manifold – 3" or larger Schedule 40 PVC pipe used in distributing a flowing discharge from some type of advanced treatment unit or treatment filter, such as a Plant Rock Filter or Sand Filter.

101.06 Maintenance – the inspecting and evaluating of an Alternative System or Advanced Treatment System. The replacement of any component registered with a specific Advanced Treatment System (i.e., aerator, diffuser, control panel, etc.).

101.07 Multi-point discharge – 2 or 4 discharge points that deliver effluent from a level manifold. (Figure I, Figure II and Figure IV)

101.08 Single point discharge – discharge line consisting of 1 point only.

102 DESIGN

102.01 The discharge area receiving the effluent shall have a minimum 6 inches of naturally occurring soil free of a restrictive horizon, redoximorphic feature or predominately-grey color (>50%) and shall be maintained to prevent surface accumulation or ponding. Overland Discharge is not recommendable on hydric soils conditions.

102.02 The texture of the subsoil material having the slowest permeability rates within 2 feet below the surface receiving effluent shall be used to determine setback.

102.03 The discharge area must be sufficiently sized to maintain the outermost edge of the effluent.

102.04 Slopes of greater than 20 percent shall not be considered for discharge areas unless justified by a Certified Engineer Evaluator

103 LOCATION/SETBACKS

103.01 The discharge area must be seeded, maintained with sod, permanent vegetative cover, or a wooded area.

103.02 Discharge area must be a minimum of:

1. Water Supply

   a. 100 feet from any public, private or individual potable water sources, unless protected by topographic features.

   b. 50 feet from any public, private or individual potable water source for all vessel(s) holding wastewater.

   c. 10 feet horizontal separation from any potable water line.

   d. 10 feet horizontal separation from any water meter.

   e. Potable water lines must not pass under or through any part of the wastewater disposal system which includes the collection and distribution of the wastewater or effluent.

2. Sensitive Waters

   a. 100 feet on slopes of greater than 8 percent

   b. Slopes of less than or equal to 8 percent (Table I)

3. Property Lines

   a. 50 feet down slope or same grade

b. 10 feet up slope.

4. Residence and Buildings

a. 25 feet from habitable

b. 15 feet from non-habitable

5. Additional Structures

a. 25 feet from porches, patios and decks

b. 10 feet from walkways, driveways and parking areas

c. 25 feet from swimming pools

d. 10 feet horizontal separation from an Advanced Treatment System

103.03 Discharge area shall not be located in depressed areas where surface water will accumulate. Provisions shall be made to minimize the flow of surface water over the effluent disposal area.

103.04 Where all or part of the treatment and disposal system is proposed to be installed on property other than the owner's, a deeded easement in perpetuity shall be legally recorded in the appropriate county. The deeded easement shall be obtained to include a sufficient area to permit access, construction and maintenance.

103.05 Deeded easements or right-of-way areas for utilities, surface or subsurface drainage, roads, streets, ponds or lakes shall not be used as available space for location of discharge areas.

103.06 No site utilizing a discharge area shall be approved which is located wholly within an area which is frequently flooded, swamp, marsh, wetland, or drainway, etc. When a site is located partially within this area, that portion not directly affected may be considered for discharge area.

103.07 Treatment, disposal, disinfection and/or pump chambers shall not be located under dwellings or other permanent structures.

104 TREATMENT

104.01 Wastewater disposed of by Overland Discharge must meet the requirement established by *American National Standards Institute/National Sanitation Foundation (ANSI/NSF) International Standard Number 40* testing protocol, as set forth in Regulation Governing Residential Individual Onsite Wastewater Disposal Systems: Certification.

104.02 Treated effluent must be adequately disinfected as outlined in Appendix 11 (Design Standard for Disinfection).

105 DISTRIBUTION

The inlet and outlet on the tank (septic tank or ATU) must be 4 inch Schedule 40 pipe for a minimum of 3 feet onto undisturbed soil. Once the outlet pipe has extended a minimum of 3 feet onto undisturbed soil, it can then be reduced to a minimum of 3 inch Schedule 40 pipe for the entire discharge line.

105.01 Gravity Fed

1. Single point discharge:

   Gravity-fed discharge using a single point discharge line on 1% or greater slope

2. Distribution manifold:

   For gravity-fed multi-point discharge distribution by manifold, the level manifold must be constructed using flow diverting devices (Figure I) in such a manner to be self draining.

3. Distribution box (Figure III):

   A distribution box may used for multi-point discharge. The distribution box must be installed level to ensure equal distribution of effluent. Outlet lines should have equal slopes for a minimum of 5 feet after leaving the D-box. The D-box should have a baffle wall, or some means of reducing the pressure from the inlet flow.

105.02 Pressurized distribution

1. Distribution box (Figure III):

   A distribution box may used for multi-point discharge. The distribution box must be installed level to ensure equal distribution of effluent. Outlet lines should have equal slopes for a minimum of 5 feet after leaving the D-box. The D-box should have a baffle wall, or some means of reducing the pressure from the inlet flow.

2. Distribution manifold (Figure IV):

   If effluent is to be delivered to a level manifold under pressure, the distribution system shall be designed to provide pressure at the point of discharge not to exceed 5 pounds per square inch. This can be achieved by pumping directly into the head of the manifold or into a baffled distribution box.

Table I **SETBACK REQUIREMENTS FROM SENSITIVE WATER**

Surface Applications

Minimum Distance from the Water Edge

Soil Textural Class	Slope of Less Than or Equal to 8 Percent	Slope of Greater Than 8 Percent
Gravel	NOT APPLICABLE	
Coarse Sand Medium Sand Fine Sand Loamy Sand Sandy Loam	75 feet	100 feet
Light Loam Heavy Loam Silt Loam Sandy Clay Loam Light Clay Loam Heavy Clay Loam Light Silty Clay Loam Heavy Silty Clay Loam	50 feet	
Sandy Clay Silty Clay Clay	75 feet	

Figure I

Gravity-fed Manifold

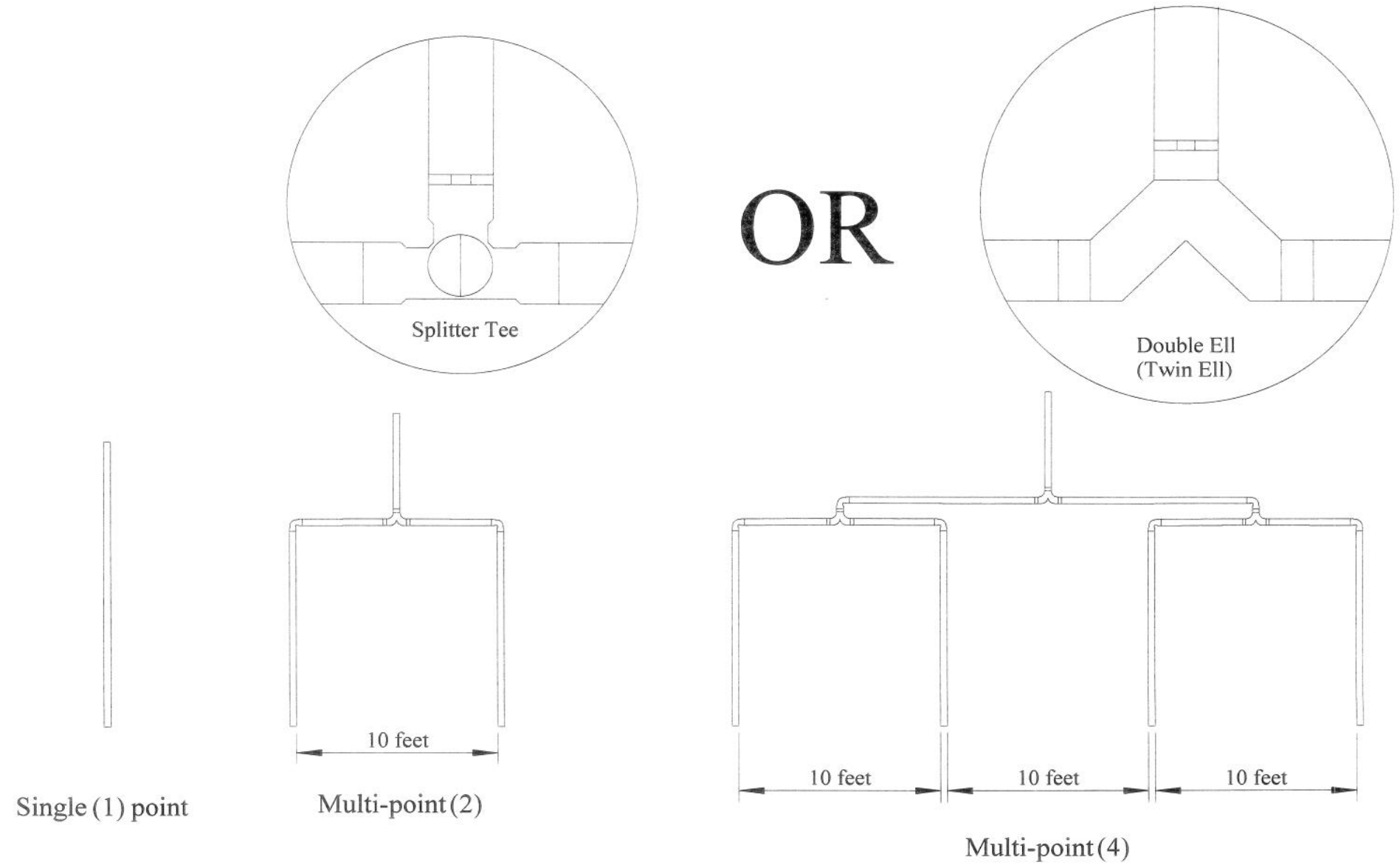
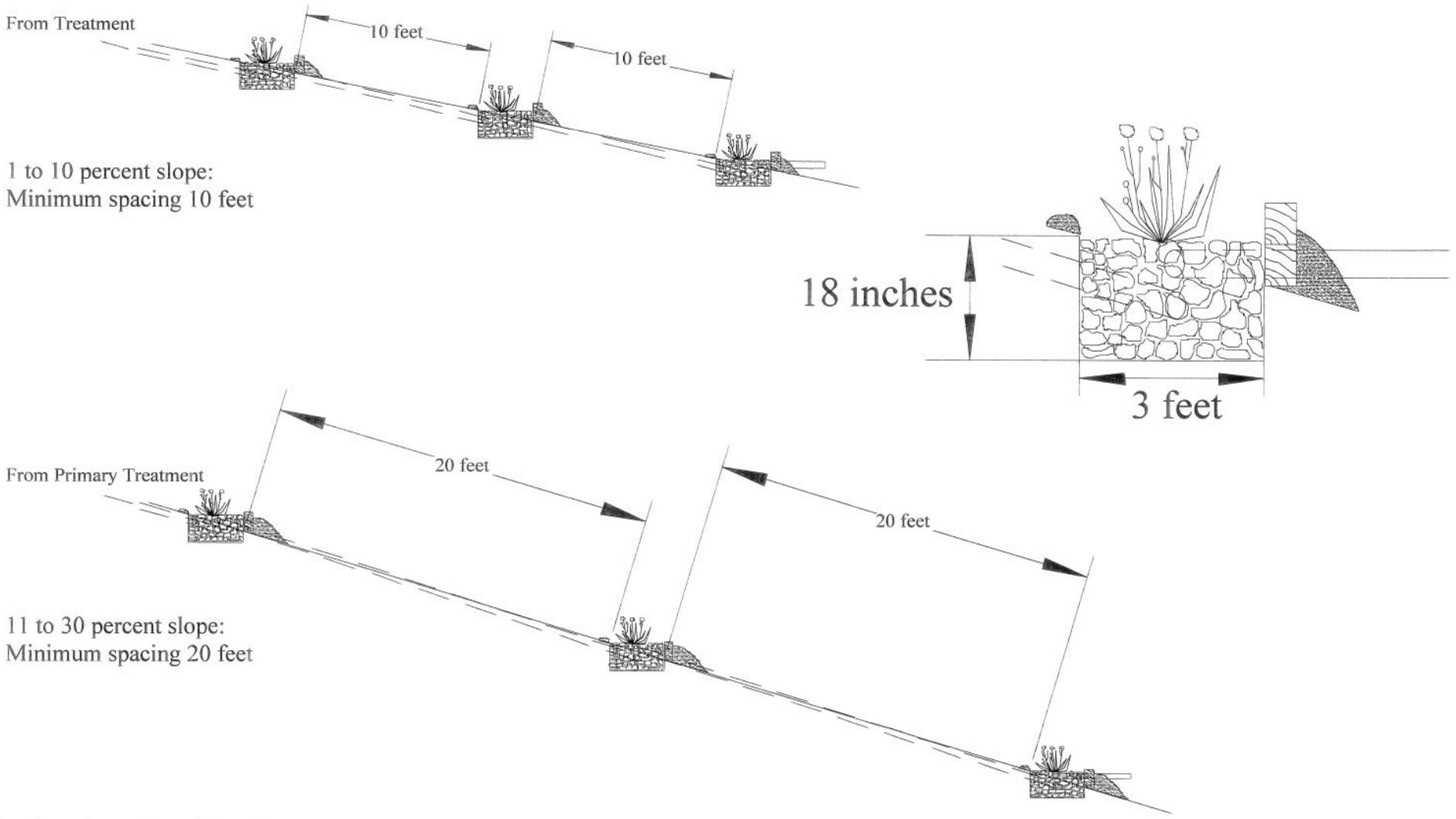


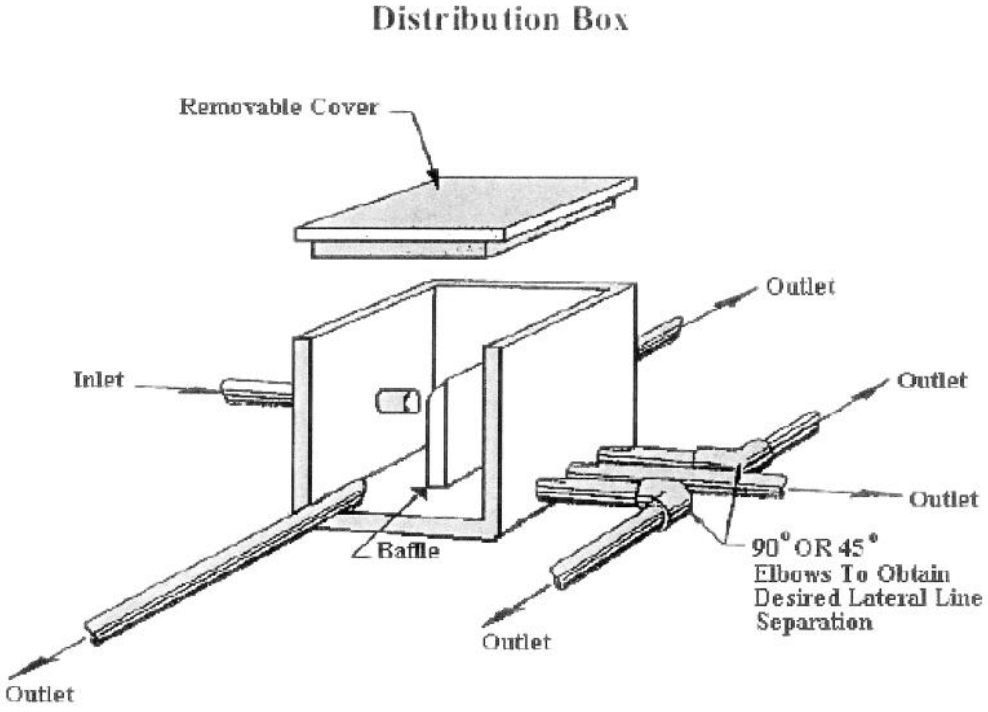
Figure II

Terrace Plant Beds



Further absorption of the effluent could be enhanced with the addition of plantings (canna, calla lilies, elephant ears, etc.) in a bed following the distribution manifold.

Figure III Distribution Box



- The inlet line into the distribution box may be gravity-fed or pressurized.
- Outlet lines should extend a minimum of 5 feet before changing elevation.

Figure IV

Pressurized Distribution Manifold